

# Factors Associated with Low Hepatitis B Vaccination Turn-Up Among Students at KIU-WC Bushenyi District

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## ABSTRACT

Globally, it was estimated that more than 2 billion people are infected with HBV. Of these, 350 million people are chronically infected and more than 500,000 people die each year of hepatitis-B-related diseases. The study assessed factors associated with low hepatitis b vaccination turnout among students at KIU-WC Bushenyi district. The study was descriptive and involved 150 participants selected by simple random sampling in which a questionnaire was used as the main tool of data collection. The study shows that a greater number of students had never been vaccinated 77(51.4%) The study also concludes that female gender was significantly associated with hepatitis B vaccination at OR, of 0.42(0.28-5.33) and PV of 0.014. The study also shows that age above 25 years was significantly associated with hepatitis B vaccination at OR, of 0.52(0.38-4.84) and PV, of 0.023. The study concludes that only 32(43.8%) students had had complete vaccination. The study recommends that students should be healthily educated on the importance of hepatitis B vaccination to encourage a lot of students to vaccinate. The study also recommends that the government should extend health services to the students to encourage a greater number of students to vaccinate. The study also recommends that the government should ensure the availability of the vaccine in health centres to encourage a greater number of students to vaccinate.

**Keywords:** Hepatitis B vaccination, Students, Hepatitis-B-related diseases, Government, Health centres.

## INTRODUCTION

The hepatitis B vaccine is recommended for all infants, all adults aged 19 through 59 years, and adults aged 60 years or older with risk factors for hepatitis B infection. Adults who are 60 years or older without known risk factors for hepatitis B may also receive the hepatitis B vaccine, [1]. Globally, it's estimated that more than 2 billion people are infected with HBV. Of these, 350 million people are chronically infected and more than 500,000 people die each year of hepatitis-B-related diseases, [2]. In Sub-Saharan Africa, about 5% of the population are chronic carriers of HBV, and nearly 25 % of all carries develop serious liver diseases such as chronic hepatitis, cirrhosis, and primary hepatocellular carcinoma [3].

The prevalence of HBV surface antigen (HBsAg), a marker of chronic HBV infection, ranged from 6 to 15% among blood donors when HBV screening was introduced, and in selected populations in East Africa, [4, 5, 6]. A study on hepatitis in Uganda by [7], among medical students showed the prevalence of HBsAg ranged from 8 to 11%. These studies found a prevalence of HBV core antibodies (HBcAb) between 20 and 26%, which, in the absence of HBV

vaccination programs, suggests that two-thirds of the Ugandan population is infected with HBV during their lifetime, [7]. In a study at Mulago Hospital among medical students doing an internship and clinical placements, only 23% of them were vaccinated against HBV, even after the creation of awareness by the UMoH, [8]. They observed that Hepatitis B vaccination is safe and effective against HBV infection when it is given either before exposure or shortly after exposure. The prevalence of hepatitis B, in Bushenyi and neighbouring districts remains undocumented yet KIUTH has also been having reported cases of Hepatitis B viral infections but its magnitude is not well established. This study will therefore bridge this literature gap.

### Statement of the problem

A UNICEF report in 2020 noted that medical students are susceptible to HBV infection during their exposure to clinical cases and different procedures over 1.8 million are infected by hepatitis annually through such procedures, hence have been vaccinated against HBV before coming to the clinical side, as they acquire good immune response with immune memory, whereby three doses of vaccination

should be provided free of charge to all the students by hospitals, [9]. In Sub-Saharan Africa, about 65000 patients die annually as a result of HBV-related liver disease, such as liver cirrhosis, end-stage liver disease, or hepatocellular carcinoma, with most of these deaths in developing countries, [10]. In a related study carried out at Kenyatta University in 2019, it was recommended that vaccination is the most effective tool in preventing the transmission of HBV and HD. Vaccines are composed of the surface antigen of HBV (HBsAg) and are produced by two different methods: plasma-derived or recombinant DNA. When administered properly, the hepatitis B vaccine induces protection in about 95% of recipients, [2]. In Uganda a study by Braka, F, et al, in 2020 showed that less than half of Students who are in proximity to teaching hospitals are vaccinated against HBV, and this has been recognized as a risk for hepatitis B virus (HBV) exposure with previous revealing up to 28% risk of acquiring Hepatitis B infection. Despite infection control precautions and

the availability of the hepatitis B vaccine, healthcare providers remain at risk of acquiring blood-borne viral infections [10]. Although the Hep B vaccine has been recommended for HCP for more than two decades, vaccine coverage has remained below the Healthy People 2014 coverage goal of 90% [11]. Hepatitis B is prevented through vaccination, [12]. The vaccine against HBV has been available since 1982 with 95 % effectiveness in preventing infection and development of chronic Hepatitis [13]. In Uganda, Uganda National Expanded Program on Vaccination (UNEPI) in 2016 emphasized a need for vaccination against HBV however despite the introduction of a safe and effective HBV vaccine in 2012, this vaccine is still consistently underutilized among the students in public universities and tertiary institutions. The researcher will therefore embark on a study to determine the level of vaccination against HBV, the factors affecting hepatitis B vaccination and the level of HBV dropouts among students at KIUWC.

## METHODOLOGY

### Study Design

This study was cross-sectional in design and descriptive in nature, using a questionnaire to collect data [14].

### Area of Study

The study was done at KIUWC, located in the town of Ishaka, in Bushenyi District, Western Uganda, approximately 330 kilometres (210 mi), by road, southwest of Kampala, Uganda's largest city and capital, The campus is also referred to as Kampala International University Western Campus. The coordinates of Kampala International University's Western Campus are: 0°32'19.0"S, 30°08'40.0"E (Latitude: 0.538611; Longitude: 30.144444. KIUWC was established in 2004 and admitted the first batch of students that year. Those pioneer students, numbering twenty-three, graduated in 2010. The students at the school come from Uganda and other African countries, especially Kenya. The school is licensed to teach undergraduate and postgraduate courses in Human Medicine, Dentistry, Pharmacy and Nursing. KIU School of Health Sciences is recognized by the medical and dental licensing boards in Kenya, Tanzania and Uganda.

### Study Population

The study was done among Kampala International University Western Campus students, who consented to take part in the study.

### Sample size calculation

The sample size was determined using [15] formula. The formula was used to estimate the smallest possible categorical sample size for the medical students. It is given in an expression as;

$$n = \frac{z^2 p (1-p)}{d^2}$$

Where d = margin of error

n= minimum sample size

z=standard normal deviation set at 95% confidential level corresponding to 1.96

p= expected prevalence (proportion)

Therefore, taking

$$p = 11\% = 0.11$$

$$z = 1.96$$

$$Q = 1 - 0.11 = 0.89$$

$$d = 5\% = 0.05$$

Thus:

$$n = \frac{(1.96)^2 \times 0.11 \times (0.89)}{(0.05)^2}$$

n=150, were recruited into the study

### Sampling procedures

A simple random sampling was used where small size pieces of paper, having the word 'Yes' or 'No' written, were folded and given to participants to choose, whoever chose a yes participated in the study and whoever picked a no didn't participate in the study, the researcher ensured that the number of 'Yes' papers is equivalent to the required sample size in each cluster. This is to help ensure fair and random selection of respondents for the study until the actual number of respondents was achieved.

### Inclusion criteria

Any university student having a valid identification document as a KIUWC student was eligible to take part in the study and those who consented to participate in the study were recruited into the study.

### Exclusion

Those who did not consent to take part in the study and those who are not registered students of KIU western campus.

### Data collection techniques/methods and tools

The data was collected through focus group discussions whereby direct questions was posed to the respondents [16]. The questions were on one basis with both open and closed ended questions were used to acquire the response. The completed questionnaires after being administered was collected by the principal investigator from each research assistants in order not to encourage change of information.

### Data analysis

Data was compiled manually using scientific calculator then analyzed and tabulated using Microsoft word and excel. The data was presented in form of pie charts and tables. Then Data from the paper questionnaires were entered once into a computer using EpiData software. Data was then exported to Stata (version MP11.0, Stata Corporation) for cleaning and analysis. Frequencies, percentages, means, and standard deviations of the respondent's characteristics was produced.

### Ethical considerations

An introductory letter was obtained from KIU-WC after approval of the proposal by the KIU-WC Institutional Review Board. Verbal consent from the respondents was sought and assured of confidentiality for all the given information prior to the study [17].

## RESULTS

### Social demographic characteristics

**Table 1: showing social demographic characteristics.**

Variable	Frequency	Percentage
Age		
18 to 25	80	53.3
Above 25	70	46.7
Gender		
Male	81	54.0
Female	69	46.0
Religion		
Christian	131	87.3
Moslem	19	12.7

From table 1 above, majority students were between 18 to 25 years (53.3%), more males (54.0%), than

females participated in the study and majority were Christians, (87.3%).

**Table 2: Prevalence of hepatitis B vaccination**

Vaccination status	Frequency	Percentage	Cumulative frequency
Fully vaccinated	32	21.3	32
Partially vaccinated	41	27.3	73
Never vaccinated	77	51.4	150

From table 2 showing prevalence of hepatitis B vaccination among students showed that majority of the students 77(51.4%) had never been vaccinated

for hepatitis B ,41(27.3%) had been partially vaccinated and 32(21.3%) had fully vaccinated.

## Age and gender on hepatitis B vaccine

Table 3 showing age and gender on hepatitis B vaccination

Age and gender	Fully vaccinated		Partially vaccinated		Odds ratio	p- value
	Freq. (32)	Percent	Freq. (118)	Percent	95% CI	< 0.05 sg
<b>Gender</b>						
Male	12	37.5	69	58.5	Ref	
Female	20	62.5	49	41.5	0.42(0.28-6.33)	0.014
<b>Age</b>						
18-25	14	43.8	66	55.9	Ref	
Above 25	18	56.2	52	44.1	0.52(0.38-4.84)	0.023

*Sg, significance less than 0.05; confidence interval 95%*

From table three above showing age and gender with hepatitis B showed that majority of the students 20(62.5%) of the students who had fully vaccinated said that they were females while at least 69(58.5%) of those who had partially vaccinated said they were males the study showed that female gender was significantly associated with hepatitis B vaccination at odds ratio of 0.42(0.28-6.33) and p-value of 0.014 The study also assessed for students

age in which majority 18(56.2%) of the students who had fully vaccinated said that they were above 25 years while at least 66(55.9%) of those who were partially vaccinated said that they were between the age of 18- 25 the study showed that age of above 25 years was significantly associated with hepatitis B vaccination at an odds ratio of 0.52(0.38-4.840) and p-value of 0.023.

## Multivalent table for gender and age

Table 4: showing gender and age of participants

Age and gender	Bivalent		Multivalent	
	Odds ratio 95% CI	p. value	Odds ratio 95% CI	p. value
<b>Gender</b>				
Male	Ref			
Female	0.42(0.28-6.33)	0.014	0.05(0.02-1.45)	0.001
<b>Age</b>				
18-25	Ref			
Above 25	0.52(0.38-4.84)	0.023	0.25(0.11 -2.14)	0.075

Under multivalent table female students were positively likely to attend hepatitis b vaccination

while students above 25 years were less likely to utilize hepatitis b vaccination.

## Hepatitis vaccination drop outs

Table 5: showing hepatitis vaccination drop outs

Vaccination status	Frequency	Percentage	Cumulative frequency
1 <sup>st</sup> dose only	25	34.2	25
2 <sup>nd</sup> dose	16	21.9	41
Complete doses	32	43.8	73
<b>Total</b>	<b>73</b>	<b>100</b>	<b>0</b>

From table 5 above, showing hepatitis vaccination drop outs in which majority of the students 32(43.8%) completed their doses, 16(21.9%) only did

two doses while 25(34.2%) of the students did only one dose.

## Factors associated with hepatitis B vaccination

Table 6: showing factors associated with hepatitis B vaccination.

Factors associated	Fully vaccinated		Partially vaccinated		Odds ratio	p- value
	Freq. (32)	Percent	Freq. (118)	Percent	95% CI	< 0.05 sg
Cost involved						
Costly	05	15.6	71	60.2	Ref	
Manageable	27	84.4	47	39.8	0.48(0.21-4.71)	0.002
Sensitization						
Sensitized	23	71.9	56	47.5	Ref	
Not sensitization	09	28.1	62	52.5	0.13(0.05-7.49)	0.031
Fear of side effects						
Yes	0	0.0	22	18.6	Ref	
No	32	100.0	96	81.4	0.82(0.45-3.38)	0.075
Availability						
Easily accessible	30	93.8	84	71.2	Ref	
Not easily accessible	02	61.2	34	28.8	0.69(0.32-8.52)	0.224

Sg, significance less than 0.05; confidence interval 95%

From table 6 above showing factors associated with hepatitis B vaccination in which majority 27(84.4%) of the students who had fully vaccinated said that the cost involved in hepatitis vaccination was manageable while at least 71(60.2%) of those who had partially vaccinated said that hepatitis B vaccine was costly the study showed that cost of the vaccine being manageable was significantly associated with hepatitis vaccine at odds ratio of 0.48( 0.21- 4.71) and p- value of 0.002. The study also assessed for the sensitization of hepatitis B vaccination in which majority 23(71.9%) of the students said that they were sensitized while 62(52.5%) of those who partially vaccinated said that they were not sensitized the study showed that sensitization on hepatitis B vaccine was significantly associated with hepatitis B vaccination at odds ratio of 0.13(0.05-7.49) and p-value of 0.031. The study

also assessed for the fear of side effects in which all students who had fully vaccinated as well as 96(81.4%) of those who had partially vaccinated said that there was no fear of the side effects the study showed that having no fear of the side effects was however not significantly associated with hepatitis vaccine at an odds ratio of 0.82(0.45-3.38) and p- the value of 0.075 The study also assessed the availability of hepatitis vaccine in which the majority 30 (93.8%) of the students who had fully vaccinated as well as 84(71.2%) of those who had partially vaccinated said that the vaccine was easily accessed the study showed that accessibility of the vaccine was however not significantly associated with hepatitis vaccine at odds ratio of 0.69(0.32-8.52) and p-value of 0.224 Multivalent table for cost and sensitization about hepatitis be vaccination.

Table 7: shows a multivalent correlation between cost and sensitization about hepatitis vaccination

Variable	Bivalent		Multivalent	
	Odds ratio, 95% CI	P value	Odds ratio	P value
Cost involved				
Costly	Ref			
Manageable	0.48(0.21-4.71)	0.002	0.52(0.31-6.22)	0.404
Sensitization				
Sensitized	Ref			
Not sensitization	0.13(0.05-7.49)	0.031	0.35(0.18-3.65)	0.000

From the multivalent table, cost was less likely to influence one seeking hepatitis b vaccination, while

lack of sensitization was positively associated with low hepatitis be vaccination.

## DISCUSSIONS

### Prevalence of hepatitis B vaccination

From the study, it showed that majority of the students 77(51.4%) had never been vaccinated for hepatitis B, 41(27.3%) had been partially vaccinated and 32(21.3%) had fully vaccinated, and this could be due to lack of awareness on the importance of hepatitis B, vaccination, when compared with other studies, according to [18], only 6% of students in Mangu Secondary School in Kenya were vaccinated against Hepatitis B virus and at least 17 of every 90 students on a cohort were vaccinated.

### Age and gender of respondents.

From the study also, majority of the students 20(62.5%) of the students who had fully vaccinated said that they were females while at least 69(58.5%) of those who had partially vaccinated said they were males the study showed that female gender was significantly associated with hepatitis B vaccination at odds ratio of 0.42(0.28-6.33) and p-value of 0.014, this could be because females have a better health seeking behavior which could have enabled them to go for hepatitis B, vaccination, The study also assessed for students age in which majority 18(56.2%) of the students who had fully vaccinated said that they were above 25 years while at least 66(55.9%) of those who partially vaccinated said that they were between the age of 18-25 the study showed that age of above 25 years was significantly associated with hepatitis B vaccination at odds ratio of 0.52(0.38-4.840) and p-value of 0.023 in comparison with other studies, the prevalence of HBV infection of 18-24% in the general population in western Uganda is in fact higher than in most parts of Uganda, and higher among men than women. Southwestern region is estimated to have an HBV prevalence of 18.5% with Bundibugyo and Kisoro Districts being the most affected [19].

### Hepatitis vaccination dropouts

From the study also, the majority of the students 32(43.8%) completed their doses, 16(21.9%) only did two doses 25(34.2%) of the students did only one dose, this could have been due to interference by the government to have the service providers verify their vaccines which made many vaccination points to close, the primary 3 dose vaccine series induces protective antibody concentrations in > 95% of healthy infants, children and young adults. After the age of 40 years, the antibody response rate declines gradually. The recommended dose varies by product and with the age of the recipient, [20]. Usually, the dose for infants and children (aged ≤ 15 years) is half the recommended adult dose. The vaccine is administered by intramuscular injection, [2].

### Factors associated with hepatitis B vaccination

From the study it showed that majority 27(84.4%) of the students who had fully vaccinated said that the cost involved in hepatitis vaccination was manageable while at least 71(60.2%) of those who had partially vaccinated said that hepatitis B vaccine was costly the study showed that cost of the vaccine being manageable was significantly associated with hepatitis vaccine at odds ratio of 0.48( 0.21- 4.71) and p- value of 0.002, when compared with other studies, [21] indicated that When vaccination was provided free-of-charge to all newborns in select provinces, average coverage of timely birth dose also increased (from 47% to 89% in township hospitals and from 61% to between 90% and 97% in the district hospital between 2014/2014 and 2017. The study also assessed the sensitization of hepatitis B vaccination in which the majority 23(71.9%) of the students said that they were sensitized while 62(52.5%) of those who were partially vaccinated said that they were not sensitized the study showed that sensitization on hepatitis B vaccine was significantly associated with hepatitis B vaccination at odds ratio of 0.13(0.05-7.49) and p- value of 0.031, prior sensitization helps students to relieve associated phobia and utilize vaccination services, when compared with other studies, according to [7], community education efforts in various settings, including East Africa is relevant in increasing HB vaccination coverage among community. Furthermore, a report from Kenya, in a survey undertaken among 3390 respondents in four towns in Kenya, stated that individuals' low awareness of HB vaccine availability and its importance were reasons for low coverage and uptake of the vaccine, [22]. The study also assessed for the fear of side effects in which all students who had fully vaccinated as well as 96(81.4%) of those who had partially vaccinated said that there was no fear of the side effects the study showed that having no fear of the side effects was however not significantly associated with hepatitis vaccine at an odds ratio of 0.82(0.45-3.38) and p- the value of 0.075, this could be due to wrong belief that students always here in relation with various vaccines when compared with other studies, studies by [23] showed that Despite the introduction of a safe and effective HBV vaccine in 2012, this vaccine is still consistently underutilized among the population of Uganda, [23]. In comparison by Lavanchy, D, 2019, developing countries like Uganda with only 5% coverage, Kenya (13%), and Egypt with 16% coverage of the HB Vaccine. The hepatitis B coverage in Uganda remains

substantially below the Healthy People 2020 target of 85%, [24]. According to [3], the first of hepatitis B, is given on first, the second dose given one month after first dose, while the third dose given, 5 months after the second dose, [3]. The study also assessed for the availability of hepatitis vaccine in which majority 30 (93.8%) of the students who had fully vaccinated as well as 84(71.2%) of those who had partially vaccinated said that the vaccine was easily accessed the study showed that accessibility of the

vaccine was however not significantly associated with hepatitis vaccine at an odds ratio of 0.69(0.32-8.52) and p- the value of 0.224, this could be because the availability of services helps students to have easy access to hepatitis B, service, when compared with other studies, According to [25] in Africa only 61.6% of infant received a birth dose of HBV. This was attributed to the unavailability of vaccine as a strong predictor of no receipt of HB vaccine in this study only in which only.

## CONCLUSION

The study concludes that a greater number of students 77(51.4%) had never been vaccinated for hepatitis B. The study also concludes that the female gender was significantly associated with hepatitis B vaccination at an odds ratio of 0.42(0.28-5.33) and p-value of 0.014. The study also concludes that age above 25 years was significantly associated with hepatitis B vaccination at an odds ratio of 0.52(0.38-4.84) and p-value of 0.023. The study also concludes that at least a greater number of students had had complete vaccination 32(43.8%).

## Recommendation

The study recommends that students should be healthily educated on the importance of hepatitis B vaccination to encourage a lot of students to vaccinate. The study also recommends that the government should extend health services to the students to encourage a greater number of students to vaccinate. The study also recommends that the government should ensure the availability of the vaccine in health centres to encourage a greater number of students to vaccinate. The study also recommends that the government should employ well-trained personnel to ensure quick and proper vaccination to encourage students to vaccinate.

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